

CLAIMS:

We claim:

1. An implantable hearing aid transducer, the transducer comprising:
a transducer housing;
5 an actuator to stimulate an auditory component of a patient;
a driver comprising at least one magnet and one coil, wherein one of the at least one magnet and one coil is connectable to the actuator to induce movement of the actuator relative to the transducer housing in response to transducer drive signals; and
a seal disposed around the one of the at least one magnet and one coil
10 connected to the actuator to protect the one of the at least one magnet and one coil connected to the actuator from body fluids.
2. The transducer of Claim 1 wherein the actuator is connectable to the one of the at least one magnet and one coil subsequent to the transducer housing being implanted
15 in the patient.
3. The transducer of Claim 2 comprising:
a tube connected to the one of the at least one magnet and one coil, wherein the tube is connectable to the actuator subsequent to the transducer housing being
20 implanted in the patient to connect the one of the at least one magnet and one coil to the actuator.
4. The transducer of Claim 3 comprising:
connecting means for movably connecting the tube within an aperture defined
25 between a first end and a second end of the transducer housing, wherein the connecting means permits the one of the at least one magnet and one coil to induce movement of the tube within the aperture relative to the transducer housing.
5. The transducer of Claim 4 wherein the connecting means permits axial
30 movement of the tube while restricting lateral movement of the tube relative to the transducer housing.

6. The transducer of Claim 4 wherein the connecting means comprises:
a spring washer connected about a first portion to the transducer housing and a
second portion to the tube.

5 7. The transducer of Claim 6 wherein the spring washer comprises:
helical openings to permit the second portion of the spring washer to flex relative
to the transducer housing.

8. The transducer of Claim 6 wherein the first portion of the spring washer is
10 connected to a first end of the transducer housing and the second portion of the spring
washer is connected to a first end of the tube.

9. The transducer of Claim 8 comprising:
a second spring washer connected about a first portion to a second end of the
15 transducer housing and connected about a second portion to a second end of the tube.

10. The transducer of Claim 4 wherein the connecting means comprises:
a compliant member physically interposed between at least a portion of the tube
and a wall of the transducer housing defining the aperture between the first end and the
20 second end of the transducer housing.

11. The transducer of Claim 10 wherein the compliant member comprises:
an elastomeric material.

25 12. The transducer of Claim 10 wherein the seal comprises:
the compliant member.

13. The transducer of Claim 4 wherein the tube is selectively connectable and
disconnectable to the actuator.

14. The transducer of Claim 1 wherein the seal comprises:

a gold plated layer formed over the one of the at least one magnet and one coil connected to the actuator.

5 15. The transducer of Claim 1 wherein the seal comprises:

a titanium layer formed over the one of the at least one magnet and one coil connected to the actuator.

16. An implantable hearing aid transducer, the transducer comprising:

10 a transducer housing;

an actuator to stimulate an auditory component of a patient;

a driver comprising at least one magnet and one coil to induce movement of the actuator relative to the transducer housing in response to transducer drive signals;

15 a seal disposed around the one of the at least one magnet and one coil to protect the one of the at least one magnet and one coil from body fluids; and

a compliant connecting means for connecting the actuator in a movable manner to the transducer housing.

17. The transducer of Claim 16 wherein the connecting means movably connects the
20 actuator within an aperture defined between a first end and a second end of the transducer housing, wherein the connecting means permits the one of the at least one magnet and one coil to induce axial movement of the actuator within the aperture.

18. The transducer of Claim 17 wherein the connecting means comprises:

25 a mechanical apparatus connected about a first portion to the transducer housing and a second portion to the actuator.

19. The transducer of Claim 17 wherein the connecting means comprises:

30 a annular spring washer connected about a first portion to the transducer housing and a second portion to the actuator.

20. The transducer of Claim 17 wherein the connecting member comprises:

a material having compliant characteristics, wherein the material is physically interposed between at least a portion of the actuator and a wall of the transducer housing defining the aperture between the first end and the second end of the transducer housing.

21. The transducer of Claim 17 wherein the actuator is connectable to a tube and wherein the connecting means movably connects the tube within the aperture and permits the one of the at least one magnet and one coil to induce simultaneous movement of the tube and actuator within the aperture relative to the transducer housing.

22. An implantable hearing aid transducer, the transducer comprising:

a transducer housing;

an actuator to stimulate an auditory component of a patient;

a driver comprising at least one magnet and one coil to induce movement of the actuator relative to the transducer housing in response to transducer drive signals;

a seal located at a first location to seal at least one of the magnet and the coil to protect the one of the magnet and coil from body fluids; and

connecting means located at a second location for connecting the actuator in a movable manner to the transducer housing, wherein the first location and the second location are different

23. The transducer of Claim 22 wherein the connecting means movably connects the actuator within an aperture defined between a first end and a second end of the transducer housing, wherein the connecting means permits one of the at least one magnet and one coil to induce movement of the actuator within the aperture relative to the transducer housing.

24. The transducer of Claim 23 wherein the connecting means comprises:
a compliant member connected about a first portion to the transducer housing
and a second portion to the actuator.

5 25. The transducer of Claim 24 wherein the compliant member comprises:
a spring washer connected about a first portion to an end of the transducer
housing and a second portion to an end of the actuator.

10 26. The transducer of Claim 24 wherein the compliant member comprises:
a material having compliant characteristics physically interposed between at least
a portion of the actuator and a wall of the transducer housing defining the aperture
between the first end and the second end of the transducer housing.

15 27. The transducer of Claim 23 wherein the seal is disposed around one of the at
least one magnet and one coil.